Redfish

September, 2012 (Issue #15)

Eye on Hawkfish

Reef

Aaron discusses the Longfins!

Plants

Lea's Top 10 Aquarium Plants!

Tropical

Heros sp. 'Rotkeil'

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About Redfish

Redfish is a free-to-read magazine for fishkeeping enthusiasts.

At Redfish we believe in the free exchange of information to facilitate success by aquarium and pond hobbyists. Each month Redfish Magazine will bring you dedicated sections on tropical, coldwater, marine and ponds.

Redfish was founded in early 2011 by Jessica Drake, Nicole Sawyer, Julian Corlet and David Midgley.

We hope you enjoy this, the 15th issue of Redfish.

古池や蛙飛込む水の音
ふるいけやかわずとびこむみずのおと

Photo courtesy: (matt)

The Fine Print
Redfish Magazine

General Advice Warning

The advice contained in this publication is general in nature and has been prepared without understanding your personal situation, experience, setup, livestock and/or environmental conditions.

This general advice is not a substitute for, or equivalent of, advice from a professional aquarist, aquarium retailer or veterinarian.

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Protomelas spilonotus - Photo Brian Gratwicke

Success with plants

by Lea Maddocks

From keeping a clump of moss for spawning through to a breath-taking contest-winning layout, successfully growing plants in our aquariums can be both a useful and beautiful thing to augment our fish-keeping experience. Sadly, however, many hobbyists struggle to keep live plants. But like raising fish, raising plants can be simple to do if you start with the hardier varieties and understand their basic care requirements. Additionally, with a keen eye and some artistic flair, you can also create a stunning aquascape with nothing but basic plants when they are arranged and planted to their best advantage around some well-placed hardscape.

In this article, I'd like to share my Top Ten beginner plants, as well as a few tips for using them to full advantage in an aquascape. Once you have mastered the basics, continuing to learn about keeping aquatic plants and building your skill set in creating lush aquascapes can be as addictive as learning about raising more difficult fish.

-Over view and basics

Before we begin, let's review a handful of basics for a successful simple planted tank. Firstly, it is recommended to have a fully cycled (nitrogen cycle) tank with 0ppm ammonia and nitrite, nitrates under 40ppm. However, plants have an affinity for ammonia over nitrate (though they will use both as a nutrient source), so a good load of fast growing plants can actually help cycle your tank by removing some ammonia as well as seeding the tank with nitrifying bacteria present on the plant itself. As you can see, healthy plant growth will remove both ammonia and some nitrate, leaving your final nitrate level lower. It's also worth noting here that plants also absorb some metals and neutralise other nasties as well as increasing oxygen, so they are excellent for aquarium health.

Your pH should be between 6 – 8, though 6.5 – 7.5 will usually yield better results. Temperature should be constant, and the usual tropical tank measuring between 22 – 28 C will be ideal. Good lighting is crucial, and while this is a complex topic, for our purposes we can keep it simple. Try to ensure you have a light which is strong in both the blue and red spectrums, with less green and yellow. Many manufacturers make bulbs rated for plants, and these work very well. If you can't find this info, choose a bulb with a 'colour temperature' measured in Kelvin (K) of over 5000K, and 'cool white'. Intensity is important too, and if you are using normal fluorescents (T8 or T5), the 1.5 – 2 watt per 4-5L (or 1 gal) rule tends to work well. To achieve this, multiple bulbs over larger or deeper tanks are a good idea. Compact fluorescents and LEDs are more efficient, so the watts per gallon rule fails here, but usually more intensity is better than less. For tanks 40L (about 10 gal) or less, they are usually shallow enough not to worry too greatly about intensity, and lights which are too bright may burn leaves, so stick with a normal bulb with the best plant colour you can find.

Hardness is also an important factor, and comes in two types, general hardness (GH) and carbonate hardness (KH). Both are measured in either parts per million (ppm), or 'degrees' (dGH or dKH), which equate to 17.9ppm for each degree. The first kind, GH, is a measure of total dissolved mineral salts. These elements, predominately calcium and magnesium salts, are important trace elements for both fish and plants, and are vital for their internal to external water/salt balance (osmoregulation). Aim for a GH of 5 – 12dGH or ~50 – 215ppm depending on your chosen fish species. If your tap water has a low GH, you can raise it by adding aquarium salts which are specially formulated to contain calcium, magnesium and other trace elements. Never use regular salt (sodium chloride). The second type of hardness, KH, is a measure of dissolved carbonates, or 'carbonate alkalinity'. This is not to be confused with water being alkaline, which is the same as being basic, or having a pH over 7. Alkalinity is a measure of the 'buffering capacity' of water, being the waters ability to resist swings in pH and keep the pH stable. Good buffering is very important in a planted aquarium, as the daily cycles of plants photosynthesises and nightly respiration can cause swings in the pH, which can be stressful or even fatal to fish. Essentially this works by plants consuming dissolved CO_2, usually in the form of carbonic acid, during photosynthesis during the day and this can raise the pH (i.e., make it more basic). At night, this stops and plants respire (i.e., consume oxygen and produce CO_2) just like the other animals and bacteria in the aquarium. By doing this, more CO_2 and thus carbonic acid is produced and thus the pH is lowered again.

Carbonates can absorb these changes well, and for good buffering, shoot for a KH of 3-5dKH or ~50ppm – 90ppm. If your water is too low in KH, adding a very small amount of sodium bicarbonate (regular baking soda) will raise it. Be aware that this will also raise the pH slightly, and if your pH is too high following this then a small amount of non-phosphate pH lowing additive can be used to bring it down again. All this said, it is best to keep your water parameters and pH constant, so if your pH is raised slightly by doing this and it is still within a healthy limit for your chosen species, then simply keep it at this to avoid any unnecessary tinkering with pH chemicals and potential swings which may stress your fish. Finally, to avoid unwanted algae growth, check your phosphates and keep them low. This may be done by reducing feeding and keeping waste to a minimum with regular partial water changes (at least once a fortnight, though weekly is ideal).

Now, with that out of the way, we can let the gardening begin….

1. Java fern (*Microsprum pteropus*)

Java fern is a widely versatile, adaptable plant that grows well in just about any water condition which is within the normal range for most tropical fish. It can also do well under low or brighter light (though too intense may cause yellowing). There are several varieties of java fern, including 'Windelov' with spikey leaf tips, 'narrow leaf' with long and thin strappy leaves etc so you can have the appearance of several plants varieties in your tank when you are growing just one species. It doesn't grow very fast, but will steadily produce new leaves in healthy tanks.

Java fern is an epiphytic plant, which means that the plant absorbs its nutrients though the leaves and its roots are purely used to anchor the plant to a surface. This makes it and excellent choice for beginners or aquariums with unsuitable substrate for normal roots, or if you are using a non-nutritive substrate such as inert, regular gravel. You can tie the rhizome (the horizontal stem which produces the leaves) to a rock, piece of driftwood, gently wedge the rhizome in cracks or crevices in hardscape, or just bury the roots in the substrate. Just leave the rhizome above the substrate or it may die off. If tying, use a dark piece of cotton thread and wind it around the rhizome and object you're tying it to several times to secure it properly, just not too tight as you want to avoid damage to the stem. Its roots will anchor by themselves in time to whatever they are nearest to, and any cotton will eventually disintegrate.

The added benefit of using epiphytic plants this way is that they can be easily moved about the tank for cleaning or to change the aquascape without harming the plant at all. It also means you can instantly have some plant growth in the mid section of the tank by tying the plant at a high point on your chosen hardscape. Java fern can be used to great effect by being carefully wedged into nooks and crannies on rockwork or driftwood which can flourish into an explosion of long green leaves and look truly wonderful. Tying fern to various points along a large branch reaching up or across the tank can be a striking way to lift your garden right into the middle to top sections of the tank, which both gives cover and attracts your smaller shoaling fish and also makes your wood appear more natural.

Java fern is also incredibly easy to propagate.

Beautiful and easy to propagate. Perhaps the best choice for the new aquarist is Java fern!

2. Anubias (*Anubias* sp.)

Like java fern, anubias is another great hardy plant which is epiphytic, widely adaptable and comes in an even wider range of varieties. These range from large to small, though all have single leaves on the end from a long stalk rising from the rhizome. These plants are somewhat less tolerant of bright light, and thrive in shady spots. This makes them ideal for filling in the shaded spots beneath tall stemmed plant canopies. Anubias tend to grow very slowly. It is also for this reason that these plants can be more expensive in stores, but they are worth the wait.

Anubias are also (apparently), bad tasting to many herbivorous fish. Some may be nibbled, but then left alone. This makes this plant a good choice for aquariums where other plants are likely to be quickly eaten by its residents. Like java fern, anubias roots are chiefly for anchorage, so tie the rhizome to a rock or piece of wood and it will attach itself in time. It can also be propagated via carefully cutting the rhizome, though ensure it has a good few

Tolerant of moderate lighting, Anubias cultivars are beautiful aroids for the aquarium.

leaves on it to support growth or it may die back.

3. Mosses

While more aquatic moss varieties are increasing in availability to hobbyists, I will focus on the tried and tested Java (*Taxiphyllum barbieri*) moss here. Chances are, your fish will die before this stuff. I personally have had clumps of this in a spare quarantine tank which has no light and has both heater and filter switched off unless it is in use (which is rarely). I also live in a part of Australia where winters can be sub zero at night, and barely a few degrees in my home. It soldiers on – no real growth, but it lives and recovers quickly when placed into a new well lit tank.

Under favorable tank conditions, however, java moss will take off from where ever you place it and grow into a tangled green, fluffy ball that slowly but surely attaches to anything nearby. Just gently poke it onto crevices, tie it to a piece of wood or stone with cotton, or just sit a piece of hardscape on top of it and watch it go. I've seen professional aquascapes which look striking with moss and fern tied to long arching branches of driftwood. Do note that it will grow over and smother other plants, so it's wise to keep it in check. Trimmed and/or pressed flat, it can be trained into a grassy mat, or left to its own devices near the rear of the tank, it will soon start climbing the walls. Some hobbyists recommend pressing it over some green garden mesh and allowed to grow in a spare tank, and soon you'll have a moss 'wall' that you can use as an in-tank aquarium backing!

Grown here on the backwall of the aquarium, Java Moss is a flexible plant for the aquascaper that is tolerant of much neglect.

Any spare moss is also the perfect spawning medium. Let it float in a spare tank with dim lighting and small sponge filter, and voila, your breeding tank is ready to go. Small shrimp also love moss, and a good handful is an essential hiding place, breeding and grazing area for any shrimp tank. They won't eat the plant, but the biofilm from the leaves, and the high surface area means that there is lots of this food constantly available.

4. Hornwort (*Ceratophyllum demersum*) and pennywort (*Hydrocotyle leucocephala* or *Cardamine lyrata*)

Both of these plants are excellent in a starter planted aquarium. Not only are they fast growers, absorbing excess nutrients rapidly and starving algae, but they can both be grown free-floating. Both can be planted, but I find it is easier and more useful to allow them to float. This doesn't mean that you need to let them sit only at the surface. I find both of these plants are more effectively used when intertwined between other stem plants and around hardscape to create bushier-looking thickets without having to plant densely. This way, it can also turn a uniform stand of plants into something with more variety easily. Also, if planting a mix of species together, the roots of one species may have the capacity to outcompete the other for nutrients, leaving the lesser plant to die away. Tangling in floaters among an established plant stand circumvents this nicely, and it is easy to prune or pull out if you wish.

ABOUT THE AUTHOR

Lea Maddocks

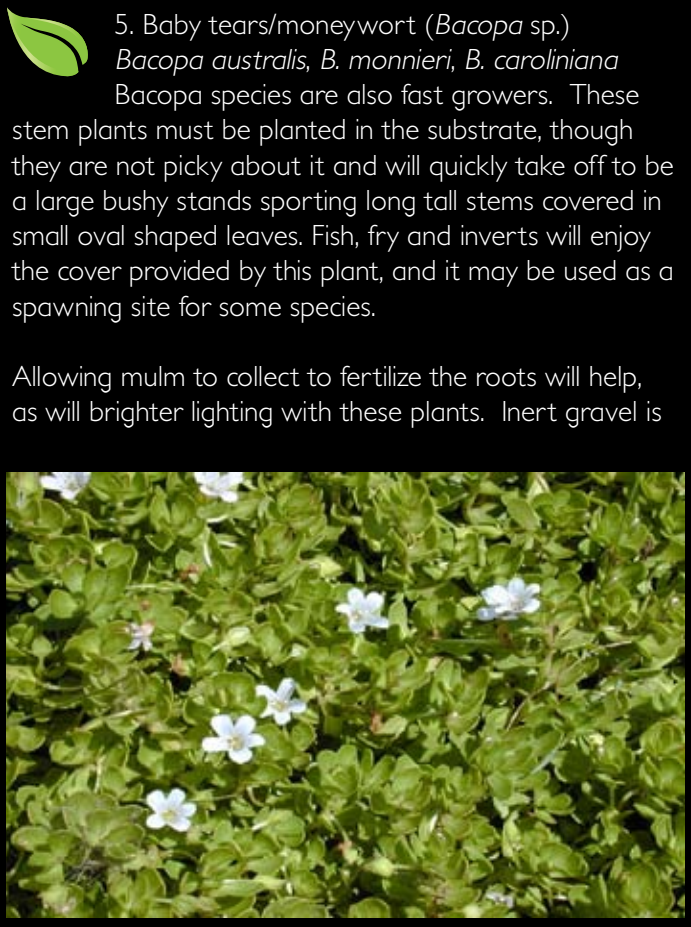
Lea Maddocks has been a long-time fish enthusiast, SCUBA diving since age 15. A biologist (BSc, Hons, MPhil), Lea has a fascination with aquarium science including fish and invert husbandry, planted aquariums, reefs, and the art of aquascaping. Lea now operates Acumen Aquatics (www.acumenaquatics.com) providing aquarium installs, assistance, and maintenance; supplies her own FinSafe betta ornaments; is an active member of the Canberra District Aquarium Society, contributes to several fish and aquatic plant forums; and has written for the Australian RSPCA on the nitrogen cycle, goldfish and betta care. Lea owns three planted tanks, and routinely maintains many freshwater tanks, a turtle tank, a marine reef, and is a volunteer worker at the National Zoo & Aquarium in Canberra - in the aquarium section of course.

Hornwort (*Ceratophyllum demersum*) and pennywort (*Hydrocotyle leucocephala* or *Cardamine lyrata*) are fast growing species that are well suited to beginners. Photo by Lea Maddocks

The leaf shapes of both these plants are also quite unusual. Hornwort is quite like tinsel, and the tips can turn an attractive rusty colour when near the light. Penny wort resembles small lily pads, each with little roots and all connected by stems, and it is a pleasing light green. These shapes will easily stand out against other stemmed plants and so they are a great and easy choice for adding focal points and variation among large stands.

5. Baby tears/moneywort (*Bacopa* sp.)
Bacopa australis, *B. monnieri*, *B. caroliniana*
Bacopa species are also fast growers. These stem plants must be planted in the substrate, though they are not picky about it and will quickly take off to be a large bushy stands sporting long tall stems covered in small oval shaped leaves. Fish, fry and inverts will enjoy the cover provided by this plant, and it may be used as a spawning site for some species.

Allowing mulm to collect to fertilize the roots will help, as will brighter lighting with these plants. Inert gravel is quite fine, provided that the grain size is small enough to allow them to root properly (pea gravel or smaller is best, though fine sand may cause rooting problems). Their fast growth will assist in absorbing nutrients from the tank, though this also means that they do require pruning. Given the fast growth, they may require some supplementation with liquid fertilizers or a slow release root tabs/ball. These plants can be used to great effect in the back or sides of an aquarium, and their hardy nature and fairly easy care requirements make them a great starter plant for a tank with the basic light and substrate requirements.



Bacopa is a remarkably forgiving species. Some plants sold by aquariums are grown out of the water (like this *B. monnieri* shown above), when submerged they can suffer a little and lose condtion. Photo by Forest and Kim Starr.

6. Hygrophillia (*Hygrophillia* sp.)
Green hygro – *Hygrophila polysperma*, Water wisteria – *Hygrophila difformis*, Willow hygro , Sunset hygro
Hygrophillia species are one of my favorite stem plants for low tech aquariums. There are a wide number of species and many of them look quite different, though most have very similar care requirements so you can keep them together with ease in the right tank. Requirements are similar to Bacopa, with moderate light and small grain gravel being the basics. However, some species, H. difformis in particular, will also do well floating. Again, extra fertilizers are a useful addition should the plant show signs of deficiency, which is a possibility given the rapid growth rates of these species.

Water wisteria isnt related to the terrestrial vine of the same name -- though it's equally beautiful. It's a perrenial favourite amongst aquarists for good reason. Simple, elegant and easy.

These stem plants offer lush cover for fish and are an easy way to provide a thicket of bushy growth in your tank. Their fast growth rate also encourages competition with algae and absorbing of ammonia and excess nitrates. As the leaves of the various hygro's are larger than Bacopa, I find them excellent for creating dense bushes for hiding internal filters and heaters, as well as covering odd bits of hardscape and filling gaps. They also make a striking impact in larger or taller tanks. Among the best hygro species for beginners are water

wisteria with its fern-like leaves, green hygro with basic oval leaves and simple care, sunset hygro with its red/brown/pink tones (though it may need more light and iron to really flourish) and willow hygro for larger tanks – the long strap-like leaves of this one can reach over 15cm long and flow beautifully in a little current. This plant will favor planting in substrate, and a root tab/fertilizer ball will be welcomed. Pruning will be required, and this plant can again be easily propagated by removing the lower few leaves from pruned tips and replanting in the substrate.

As hygrophillia species can grow quite tall, placement at the back of the aquarium is best. All species make a wonderful backdrop for any hardscape or medium sized plants placed in front.

7. Ludwigia (*Ludwigia* sp.)

Ludwigia species are another great beginner choice and similar to hygro and bacopa in requirements and propagation technique. The most widely used and well-known to aquarists is *L. repens*, which is a beautiful plant similar to *H. polysperma* in shape. The most distinguishing feature of this plant is its pink/red tones on the leaves, which become more intense under brighter lighting. Lacking in light, this plant will look a nice shade of green with some brown/red tinges. Under moderate light, the plant appears to attractively morph colour, with green at the base and brow through to red/bright pink at the growing tips nearer to the light.

Iron supplements are usually recommended for redder plants, and this plant will certainly benefit from a basic liquid fertilizer supplement or a root tab/ball. However, it is not necessary under lower light, as lower light makes for slower growing plants that demand less fertilizer. Even in lower light, the plant will still produce some warm tones at the tips and grow well.

Like Bacopa, Ludwigia is sometimes grown as shown above, out of the water. Submerging it suddenly can affect its condition, try and buy the submerged form if available.

Easy to grow, provided the roots are not disturbed. Can be a little fussy at first and slow to start. Once it starts to send up new plantlets, you're in for a treat!

This is another good fast grower, and given its colour and hardiness compared to other plants with red tones it is excellent for breaking up the green and adding some warmth to the colour of your aquatic garden.

8. Lace fern/water sprite (*Ceratopteris thalictroides* and *Ceratopteris cornuta*)

Possibly one of the best stem plants to add to a new aquarium is lace fern. This plant displays attractive green fern-like fronds, grows quickly, is not picky about nutrients of light, as long as there is a moderate amount of each, and is easily grown as either a floating plant with long roots trailing into the tank, or with the roots planted in the substrate. Even with some roots just weighed down with a rock and/or hidden behind other plants or hardscape, this will do well and in fact seems to do very well with roots exposed in an aquarium with inert gravel. Stems will grow together from a single point where the roots also emerge, and can be wide and lace-like or narrower and more spiked in brighter light.

This is another great plant for gap-filling and hiding equipment, and also a great one for helping cycle new tanks as it grows quickly with little maintenance. Pruning is a must on occasion given the fast growth, though removing a whole stem which is dying back is advised as cut stems can brown and just die back. Propagation of this plant is similar to java fern.

9. Crypts (*Cryptocorne* sp.)

Crypts are the standard for small plants for foreground to mid-ground planting. It is a diverse genus with a variety of sizes, colours and leaf shapes, though all leaves are borne on single stems arising from a central rhizome. These plants are easy to care for, but hate change. After being freshly planted, moved, or if the photoperiod is altered significantly, the leaves will often turn brown and slowly disintegrate. This is called 'crypt melt'. While frustrating, do not throw away your crypt.

Astonishingly fast growing, Lace Fern is arguably the best stem plant on offer to new aquarists. Photo by Budi Lukman.

Crypt melt will not kill the plant. If the dead leaves are removed and the rhizome left alone, it will establish and slowly put out fresh leaves and new roots. Once established, most crypts are very hardy and will spread slowly but surely as the rhizome grows though the substrate.

Crypts are fond of lower light, though will grow faster (like most plants) with more intensity. Compared to the stem plants, this plant grows slowly, and as such does not demand regular fertilising to keep up with its needs. Still, it will still respond to some liquid supplements and provide nice colouration. Leaf colour ranges between species, from bright green to olive green, rusty brown, and some also possess pink toned undersides, with stems usually a brownish green. Leaf shape and growth habit can also vary, from oval to elongate leaves, and from short stems tightly packed to long stems with less density. The variation in size and appearance means that they can be used both as a foreground and midground plant effectively, and larger specie even work well as a background plant in a small aquarium. Propagation is performed by gently removing the plant from the substrate without damaging the roots, and carefully cutting the rhizome. Some plants may take off when re-planted, though others may go though melt – as long as the rhizome is a few centimeters or more and intact, new plants should form in due time.

10. Swords (*Echinodorus* sp.)

Amazon swords are a must for this list. However, they do require a bit more attention than the other plants mentioned here. Fertilisers containing iron and trace elements are recommended, particularly root tab/balls as they are heavy root feeders, though some liquid nutrient dosing will also suffice. Swords also require at least moderate light in the correct spectrum to thrive (though bright is better). Despite these extra care requirements, the number of species, ease of ease of care for them all once basic needs are met, and their 'feature plant' factor makes them another great plant for a beginner looking for larger plants or something to really stand out in an aquarium.

Larger Echinodorus species made excellent specimens plants for the centre of an aquascape.

Smaller Echinodorus species (called chain swords) are often used in the foreground, as here to create a lush low cover.

Amazon swords produce many large, long oval shaped leaves, each borne upright or on a diagonal angle on a single stem arising from a central mass from which a large root system also grows. The size and orientation of the leaves makes them an attractive surface for fish such as angels to lay their eggs. Leaves are usually a vibrant green colour, though new leaves are often an attractive rusty colour as they emerge and mature. Leaf shape can also vary, with more elongated leaves on some species and other varieties showing wavy edges. Selection by aquarists has also resulted in development of many new varieties, including the recent varieties 'Ozelot' and 'Paul Klocker', which are somewhat smaller than the standard swords, and also show impressive red markings along with good overall hardiness. This makes such varieties perfect for use as feature plants and/or colourful accents in medium sized tanks, or an impressive impact in a smaller tank.

Swords are usually some of the largest growing aquatic plants available. A single sword plant could easily outgrow a regular 2ft tank, and as such these are great choices for larger or deeper aquariums. However, some varieties are smaller than others, and these are ideal for smaller tanks. Larger swords can also be kept in smaller tanks providing that old or large leaves are regularly pruned away by carefully snipping the stem away the base with dedicated stainless steel scissors, though selecting the right species for your tank size is a much better option.

With moderate lighting and nutrition, as well as adequate CO2 (liquid supplements and a lights out 'siesta' may be needed during the day to keep CO2 levels up), this plant should perform well in a low tech tank. Old leaves will occasionally turn brown at the edges, yellow and begin to melt away once new growth emerges, and these should be pruned by gently pulled out or snipped away at the base to keep the plant neat and prevent the decaying leaf fouling the water.

Propagation can be done by removing adventitious plantlets which emerge from runner from the larger parent plants, though they should be at least 5-10cm (3-5 in) big before removing. Plants can also be split, through the root ball, but this does not always work and it is not advisable to the beginner aquatic gardener as the whole plant must be removed from the aquarium to do it, which can severely disrupt the substrate as the root system in these plants are so large. Indeed, you may start to pull out your sword, just to end up accidentally uprooting the whole surrounding area! Only remove plantlets if the runner and plantlets are easy to access. Cut the runner, trim it back to near the roots of the plantlet and gently plant the plantlet in the substrate (adding a root tab/ball at this point is also a good idea to get the plant going).

CLOSE

A final word on fertilisers and maintenance. Many slower growing and hardy species will do well without additives, but should you notice yellow leaves, poor growth, and algae on your plants, it means they need a bit more help. A regular dose of liquid plant fertiliser with iron, potassium and trace elements (and nitrates if they are low) will assist greatly, as will fertiliser tabs or balls near the base of heavy root feeders like swords.

CO2 can also be a dramatically limiting factor, and this can be improved with some turbulence to mix CO2 from the air back into the water (and off-gas excess CO2 at night), as well as providing a daily dosing of liquid carbon supplement. The use of a 'siesta' period of 3-5 hours of lights-out during the day is also very useful. During a siesta period, plants slow down the rate of photosynthesis, and allow CO2 from fish, bacteria and plant respiration to build up again before the next period of lights on. Regular lighting periods are also very important to many plants, so a cheap timer is an excellent item to have.

So there you have it, a simple list to beginner aquarium plants, how to grow them successfully, and how to use them to your advantage in an aquascape. With a little time and some artistic flair, anyone should be able to produce an aquatic garden and aquascape which will provide a stunning natural home for your fish, a 'wow' from onlookers, and you with endless hours of viewing pleasure – all for a little weekly maintenance and low-tech knowhow.

Now, get (aqua)gardening!

REDHEADED SEVERUM

Name: Heros sp. 'Rotkeil'

Distribution: South America. Amazon basin near Iquitos, Peru.

Maximum size: 20 cm (8"), though many individuals slow growth markedly at around 15cm (6")

Temperament: Territorial

Diet: Omnivore, like all "Severum" species, however, the species has a requirement for more plant matter in the diet. Zucchini, sushi nori and peas are all relished.

Care: Minimum tank size of 200 litres (55 gallons). Feed with flakes and frozen foods, such as krill, brine shrimp and blood worms. Include many hiding places as well as open areas. Pairs can become very territorial, and will nip at and potentially kill any other fish which venture near. Usually a more peaceful cichlid, but can be extremely aggressive towards conspecifics, especially other males.

Gender: Difficult to determine until fish reach maturity. Males have extended dorsal and anal fins, wheras females are more rounded. Venting is possible prior to the fish reaching maturity. To get a pair, it's advisable to raise 6-8 juveniles in the same aquarium. Watch for signs of territorial behaviour by a pair and remove the remaining individuals.

the beautiful Redheaded Severum

Locations in the Amazon near Iquitos in Peru host this species of Severum.

Breeding: Redheaded Severums are typically substrate spawners, though they will sometimes spawn in overhangs, or on leaves. The most difficulty is in forming a pair. Once a pair has formed, spawning is not difficult to induce. Clear clean water is essential to get these fish to spawn and to enable the fry to hatch and thrive. Feed live or frozen whole foods, such as blood worms and small red worm to induce spawning. Females prefer to lay eggs on the outside of caves, or on any clean smooth surface area. Flat rocks, or the outside of clay pots work well for this.

Notes: This is one of the more attractive severum species. Rotkeil literally means "Red Wedge" and refers to the bright red color over the shoulder, back, and cheek areas, as well as the face, anal, and dorsal fins. Their color is much more vibrant when the fish is comfortable in its environment and is not stressed. Shares similar markings and temperament to the closely related Green Severum, which is typically also available in a xanthistic "gold" form.

Eye on Hawkfishes

The Cirrhitidae are an exclusively tropical family of marine fish. They have a mostly Indo-Pacific distribution, though some species do occur in the Atlantic. Many dwell on reefs and are well represented in the aquarium hobby with many suitable reef-safe species. Reef safe is a bit of a strange term, and many species will eat small shrimps and prawns, so their mixing in your established reef should come with some caution. Those cautions aside, the relatively sedentary nature of Hawkfishes means the group adapt well to aquarium conditions.

In total there are 12 genera in the family: *Amblycirrhitus*, *Cirrhitichthys*, *Cirrhitops*, *Cirrhitus*, *Cristacirrhitus*, *Cyprinocirrhites*, *Isocirrhitus*, *Itycirrhitus*, *Neocirrhites*, *Notocirrhitus*, *Oxycirrhites* and *Paracirrhites* that together comprise around 30 species. The genera *Cirrhitichthys*, *Neocirrhites*, *Oxycirrhites* and *Paracirrhites* best most frequently represented in the hobby.

In some ways, they look and act a bit like miniature scorpionfish and share some of scorpionfish-like habits including perching immobile on corals and rock waiting for their

Longnose Hawkfish
Oxycirrhites typus

prey (often shrimp) to come close. Hawkfish are protogynous hermaphrodites, subdominant females will change into males if the male is removed or lost. The Longnose Hawkfish (*Oxycirrhites typus*) aside, most species have not yet been successfully bred in captivity.

Longnose Hawkfish

Oxycirrhites typus

Distribution:
Found in the Red Sea and in the Indian Ocean, where it ranges from South Africa to the Hawaiian Islands, north to southern Japan and south to New Caledonia. In the Eastern Pacific they are found in the Gulf of California and to northern Colombia and the Galapagos Islands.

Habitat:
Most commonly found below 30m. This species prefers steep outer reef slopes exposed to strong currents. It perches on gorgonians and black corals and is highly territorial.

Size:
To 13 cm (5.1").

Feeding:
In the wild, this species feeds on small benthic or planktonic crustaceans. In the aquarium, the Longnose Hawkfish diet should include a variety of marine meats, frozen preparations, and live feeder shrimp.

Aquarium Care:
This species should ideally be kept in a tank no less than 115 litres (30 gallons). Rocks and corals on which the hawkfish can perch itself should be provided. The water temperature should be 24-26° C / 75-79° F. Avoid other hawkfishes and combined with fish from other families.

They are also the only Hawkfish reported to have spawned in captivity.

Longnose Hawkfish (*Oxycirrhites typus*)
Photo by Silke Baron

Longnose Hawkfish (*Oxycirrhites typus*)
Photo by Jenny Huang

Flame Hawkfish

Neocirrhites armatus

Distribution:
Found in the Pacific, ranging from the Japanese Ryukyu Islands to the Equatorial Islands and the Mangareva Island in French Polynesia. Their range proceeds southward down to the Great Barrier Reef of Australia and the Micronesian Wake islands.

Habitat:
Typically found along surge-swept reef fronts and submarine terraces to a depth of 10 metres (33 feet). Hides among branches of live corals and retreats deep into the corals when frightened.

Size:
To 9cm (3.5").

Feeding:
A carnivore species. Fond of small fish and most kind of invertebrates. In the aquarium will accept live, frozen and even dry food.

Aquarium Care:
Should ideally be kept in a tank no less than 75 litres (20 gallons). Requires well oxygenated water and constant water movement. Soluble waste should be kept to a minimum. Prefers reef aquariums and is generally considered to be a difficult species to keep.

Flame Hawkfish (*Neocirrhites armatus*)
Photo by Brian Gratwicke

Flame Hawkfish (and other Hawkfish, like this Arc-Eye Hawkfish) are frequently associated with Stylophora and Pocillopora corals.

Coral Hawkfish

Cirrhitichthys oxycephalus

Distribution:
In the Indo-Pacific they are found in the Red Sea, ranging south to East London, South Africa, east to the Marquesan Islands, north to the Mariana Islands, and south to New Caledonia. IN the Eastern Pacific they are found in the Gulf of California to Colombia and the Galapagos Islands.

Habitat:
Found to depths of 40 metres (130 feet), although most commonly 10-25 m. This species inhabits areas of coral growth and areas of clear water in lagoons, channels, or seaward reefs.

Size:
Up to 10cm (3.9 “)

Feeding:
In the wild, this species feeds on crustaceans and small fishes. In the aquarium will eat meaty marine food eg: crustacean flesh, mysis shrimp and fresh/live and frozen preparations.

Aquarium Care:
Live in harems in nature with one male and 5-7 females, however, in the aquarium they should not be kept with others of their own species as can be quite aggressive. Avoid smaller and similar-sized fish also. Generally considered to be reef safe. The water temperature should be 23-26°C / 74-79°F.

Coral Hawkfish (*Cirrhitichthys oxycephalus*)
Photo by Brian Gratwicke

a Coral Hawkfish (*Cirrhitichthys oxycephalus*) typically perched atop a coral awaiting small prey.
Photo by Laszlo Ilyes.

Forster's Hawkfish

Paracirrhites forsteri
(Also known as Freckled Hawkfish or Blackside Hawkfish)

Distribution:
In the Indo-Pacific they are found in the Red Sea and East Africa, to the Hawaiian, Line, Marquesan and Ducie islands, ranging north to southern Japan and south to New Caledonia and the Austral Islands.

Habitat:
Found to depths of 33 metres (108 feet) but known to venture a lot deeper. Inhabits clear lagoon or seaward reefs and occurs openly on coral and soft-bottom habitats, occasionally in pairs Most often seen perching on outermost branches of Stylophora, Pocillopora, and Acropora corals.

Size:
Up to 22cm (8")

Feeding:
In the wild feeds mainly on small fishes and crustaceans and sometimes on shrimps. In the aquarium the diet should include a variety of marine meats, frozen preparations, and live feeder shrimp.

Aquarium care:
A 250 litre (70 gallon) or larger aquarium is necessary for this fish. It hunts crustaceans and smaller fish, and it should be the last fish introduced to a semi-aggressive to aggressive community of fish. It becomes very territorial and will harass new additions including other hawkfish and fish that are much larger than itself.

Forster's Hawkfish (*Paracirrhites forsteri*)

Forster's Hawkfish (*Paracirrhites forsteri*)
Photo by Silke Baron

Paracirrhites forsteri is quite variable in color.

Stocky Hawkfish

Cirrhitus pinnulatus

the Stocky Hawkfish isn't a commonly kept aquarium species, though many indviduals are strikingly patterned. It is a large growing Hawkfish species that requires specialist housing.

Distribution:
Found in the Indo-Pacific in the Red Sea and ranging from East Africa to the Marquesan Islands and Mangaréva, north to southern Japan and the Hawaiian Islands and south to the Kermadec and Rapa Islands. In the Southeast Atlantic it is found on the southeast coast of South Africa.

Habitat:
Found in a depth range of 1-23m, most often at 1-3m. Inhabits reef fronts and rocky shorelines exposed to moderate to strong surges.

Despite its uncommon nature, the species adapts well to aquarium life and can be recommended for reefs that don't include small fishes or mobile inverts.

Size:
Up to 30cm (11")

Feeding:
Primarily feeds on crabs, and will also eat other crustaceans, small fishes, sea urchins or brittle stars. Will accept live and prepared foods, but will also make short work of most shrimps and small fishes.

Notes:
An uncommonly offered Hawkfish for the aquarium, the species is one of commerical fish for the table, and can be sometimes found in Hawaiian fish markets.

Aquarium Care:
This species will remain hidden much of the day, peering out from crevices. These fish can be kept with most other suitably sized tankmates in a community or reef aquarium. They will, however, prey on smaller tankmates and crustaceans like shrimp.

Arc-Eye Hawkfish

Known variously as *Paracirrhites arcatus* or *Paracirrhites amblycephalus* (Bleeker 1857)

Distribution:
In the Indo-Pacific found from East Africa to the Hawaiian, Line and Mangaréva islands, ranging north to southern Japan and south to Australia and Rapa.

Habitat:
Found up to depths of 33m (108 feet). Occurs in lagoons and seaward reefs, on heads of small branching corals, e.g. Stylophora, Pocillopora, Acropora.

Size:
Up to 20cm (7.9")

Feeding:
This fish needs a carnivore diet and in the wild feeds mainly on shrimps, small fishes, crabs, and other crustaceans. In the aquarium can be fed a variety of marine meats and live feeder shrimp.

Aquarium Care:
Tank should be at least 115 litres (30 gallons). Should be the last fish to enter the aquarium and do not combine with fish small enough to be considered food. It becomes very territorial, and will harass new additions to the tank including other hawkfish and larger fish. If placed in a reef aquarium, the Arc Eye Hawkfish will eat crabs, shrimp, anemones, and smaller fish.

Some variants lack the write lateral stripe

This individual has the white body stripe

An Arc-eye Hawkfish perches on a coral, this individual has a more peach coloured body.

Dwarf Hawkfish

Cirrhitichthys falco

Distribution:
Ranges from the Maldives to Samoa, north to the Ryukyu Islands and south to the southern Great Barrier Reef and New Caledonia.

Habitat:
Can be found in a depth of 4-46m, although most often at 10-20m. Inhabites shallow coastal to outer reef flats and slopes. It is a common inhabitant of coral reefs, and can typically be found resting at the bases of coral heads.

Size:
Up to 7cm (2 “)

Feeding:
In the wild feeds on very small fish and benthic invertebrates. In the aquarium the dwarf hawkfish will eat almost an aquarium food presented to it. They will do well on all kinds of live, frozen and flake foods.

Aquarium care:
This species is one of the least aggressive and territorial species of the Hawkfish family. As a result, the dwarf hawkfish will fit into a wider range of community aquariums. Provide plenty of hiding spaces as can be chased an nipped at by larger species. Will even learn to take food directly from the aquarium keepers fingers. Keep in a tank that is at least 115 litres (30 gallons) with a temperature of 23-27.5°C / 74-82°F.

the Dwarf Hawkfish (*C. falco*)
Photo by Brian Gratwicke

At 7cm, the Dwarf Hawkfish is more amenable to more aquaria! Photo by Nicolai Johannesen

a Dwarf Hawkfish rests atop a rock in the wild

GiantHawkfish

Cirrhitus rivulatus

Distribution:
Found in the Eastern Central Pacific, from the Gulf of California to northern Colombia and the Galapagos Islands.

Habitat:
Found at a depth range of 5 - 23 m. Lies very still on rock ledges and is well camouflaged against the rocks. Well know for it's social behaviour towards scuba divers.

Size:
Largest of the hawkfish family, with a maximum size of 60 cm (24").

Feeding:
Feeds on crustaceans and small fishes. Should be fed a steady diet of meaty preparations and live fish.

Notes:
The size of this fish dictates its for specialists only. Like the Stock Hawfish, it is sometimes eaten by humans.

Aquarium Care:
Should be kept in an aquarium of at least 450 litres (120 gallons) in size to provide plenty of swimming and living room for this fish. Giant Hawkfish are aggressive and should not be kept with other more peaceful species as it may attack and harm them.

the Giant Hawfish grows to an impressive 60cm (24")

Unusually for a Hawkfish, *C. rivulatus* has a relatively restricted distribution, being found only in the Eastern Central Pacific south to Colombia.

Redspotted Hawkfish

Amblycirrhitus pinos

Distribution:
In the Western Atlantic this species is found from southern Florida and Texas (USA), to the Bahamas and throughout the Caribbean Sea to Rio de Janeiro, Brazil.

Habitat:
Found at a depth of 2-46 m. Commonly inhabits rocky areas, often found in crevices and shallow caves. Usually lies at rest on the substrate.

Size:
To 9.5cm (3")

Feeding:
In the wild feeds on small crustaceans, particularly copepods, shrimps and shrimp larvae, crabs and crab larvae as well as polychaetes. In the aquarium, diet should include a variety of marine meats, frozen preparations, and live feeder shrimp.

Aquarium Care;
The species is a relatively uncommon aquarium species - it is sometimes available from local collections near the USA.

The aquarium to house the species should be at least 115 litres (30 gallons). This species is not known to be aggressive. Keep in a tank with lots of hiding spaces. Will usually not bother small sessile invertebrates but may eat small shrimps.

At only 9.5cm, this is one of the smaller Hawkfishes, it's also relatively peaceful. It will, however, consume small motile inverts - so mix it with some caution.

The species is found from Southern Texas and Florida, south through the Caribbean to Brazil.

Spotted Hawkfish

Cirrhitichthys aprinus

Distribution:
Found in the Western Indian Ocean in the Maldives and the Western Pacific.

Habitat:
Usually found at a depth of 12-20m but has been found as deep as 40m. A common species found in rocky and coral areas of subtidal coastal reefs and enters shallow harbors and estuaries.

Size:
Up to 12.5cm (4")

Feeding:
Diet should include a variety of marine meats, frozen preparations, and live feeder shrimp.

Notes:
This species can be easily mistaken for C. oxycephalus. C.aprinus, however, lacks spots on the caudal fin and has a obvious spot on the operculum.

Aquarium Care:
Tank should be at least 115 litres (30 gallons). A hardy and aggressive fish. It should not be kept with larger more aggressive hawkfish. Although it eats small fish and shrimp, with caution, it can make an excellent reef inhabitant.

the Spotted Hawkfish (*C. aprinus*) in the wild at Lembeh straights, North Sulawesi, Indonesia. Photo by Jens Petersen

The clear tail, and distinctive spot on the operculum assist in ID of this species. Photo by Jenny Huang.

Perched amid macro algae, this Spotted Hawkfish waits for prey to swim past.

LONGFINS
The family Plesiopidae

by Aaron Sewell

The family Plesiopidae, more commonly known as roundheads or longfins, are not particularly common in the trade, outside a handful of species though they are excellent aquarium candidates.

The family comprises of tropical, sub-tropical and temperate species which are distributed throughout the Indo-West Pacific, many of which are found in Australian waters, often exclusively. The family is divided into 12 genera consisting of a total of 49 species. Of these 49 species, only 3 are common in the trade with a handful of others appearing on occasion. All plesiopids are carnivores, with small species feeding on zooplankton while larger species generally feed on benthic invertebrates such as small shrimp.

There fish are often not difficult to breed with commercial success having been had with species in the genera *Assessor* and *Calloplesiops*. Hopefully this sees a greater abundance of these fish and a greater range available in the future.

Assessor

The genus *Assessor*, contains just 3 species, of which 2 are found in Australian waters and are

Assessor flavissimus
Photo by Budi Lukman

common in the aquarium trade. The yellow assessor, *Assessor flavissimus*, and the blue assessor, *A. macneilli*, both reach around 6cm and are ideally kept in small groups but will generally fare well as individuals or pairs. They are naturally found near ledges and overhangs where they swim upside down far enough into open water to feed on zooplankton brought across the reef by currents. Usually, after a few days to a few weeks, the behaviour will change and the fish will no longer swim upside down. Being very peaceful fish, they do well with other small tankmates such as gobies, dragonets and dartfishes. Assessors generally take well to aquarium conditions and readily accept a variety of prepared foods such as frozen brine shrimp, flakes or granulated foods.

Assessors are among the more simple to breed marine fish though very little has been done on the commercial side to allow captive bred specimens onto the Australian market. However that has begun the change in the US and hopefully it won't be long before the Australian market begins to see captive bred specimens available. They are demersal spawners and mouth brooders with the males taking care of the eggs. Spawning in captivity is not uncommon and they produce small clutches of up to 25 eggs.

Calloplesiops

The comet groupers of the genus *Calloplesiops* are very unique and interesting fish. The two species, *Calloplesiops altivelis* and the less common *C. argus*, get their common name (comet grouper of marine comet) from the shape and colouration of their body. They are predominantly black with a covering of white spots and an eyespot at the base of the 2nd dorsal fin which gives them the appearance of a comet shooting through the sky. The shape is an almost perfect oval with the dorsal, caudal, anal and pelvic fins fitting together to complete the shape.

Calloplesiops altivelis
Photo by Lonnie Huffman

This unique colouration, pattern and finnage is a classic example of Batesian mimicry which is where the animal mimics a more dangerous subject, in this case the white mouthed moray eel, *Gymnothorax meleagris*. The colouration appears as though it would allow the fish to hide in dark places when threatened but actually allows the fish to intimidate potential threats by giving it the appearance of the moray eel lurking in a rocky crevice.

Calloplesiops altivelis
Photo by Ewen Roberts

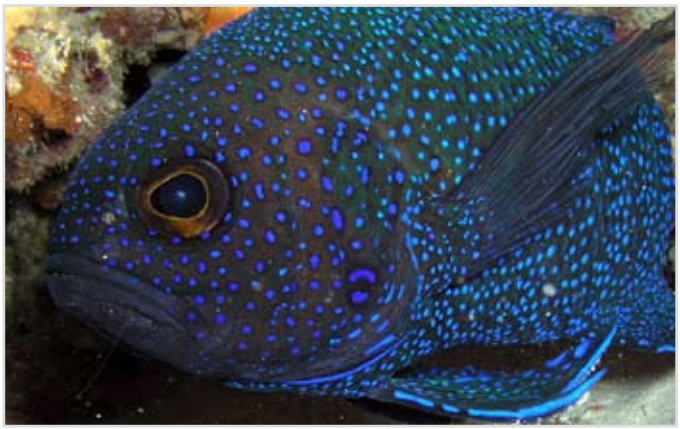
Whitemouth moray (*Gymnothorax meleagris*)
Photo by David Burdick

Paraplesiops bleekeri
Photo by Taso Viglas

Comet groupers have an unusual hunting behaviour which also relates to the colouration and patterning. The fish allows itself to drift in the current to get within range of its prey (usually small shrimp) where it curls its body over the prey before striking back towards its own tail. It is believed the spots act to confuse and almost hypnotise the prey for just long enough for the fish to strike. In the aquarium, they will readily take a variety of foods including flakes, pellets and frozen foods. A diet high in protein, specifically meat content, is ideal. As far as general tolerance to aquarium conditions, these fish are exceptionally robust and tend to do well provided they are given sufficient space.

Paraplesiops

The blue devils of the genus *Paraplesiops* are magnificent looking fish but unfortunately there are 2 drawbacks to keeping them. The first is that all but 1 species are temperate fish, being found around the southern coastlines of Australia south of the NSW/QLD border on the east coast and Perth on the west coast with just 1 species, *Paraplesiops poweri*, being found in the tropical waters of Queensland. Arguably the most spectacular of the 5 species is the eastern blue devil, *P. bleekeri*, though unfortunately it is found only in NSW where it is a protected species and therefore unavailable for collection.



Western Blue Devil (*Paraplesiops sinclairi*)

Though among the largest species in the family with the eastern blue devil and southern blue devil, *P. meleagris*, reaching around 35-40cm, the smallest species in the genus, the northern blue devil, P. poweri, reaches just 8-9cm. However, despite being an ideal species to be kept in a reef aquarium, these fish are almost unseen in the trade.

Plesiops

Species in the genus *Plesiops* are generally small fish, commonly reaching sizes of around 7-15cm with few exceptions. With a greater range than other genera, with species being found from the East coast of Africa and the Red Sea to the Central Pacific, it is somewhat surprising that they are so uncommon in the trade. These fish, like many plesiopids, are secretive rock dwellers which means that in large aquariums they can disappear for days at a time, lurking in rock crevices.

Despite being exposed to a huge range of marine species over the past dozen or so years, I have personally only seen a single fish from this genus on offer. This was a small crimson tip longfin, *Plesiops coeruleolineatus*, which took exceptionally well to aquarium life, taking frozen and pellet food within 24 hours. However, after settling into the aquarium, the fish was almost never seen. Given the reclusive nature of these fish, they are best kept in small, dimly lit aquariums with open rockwork where they can feel secure but not hide completely.

Trachinops

The genus *Trachinops*, known as hulafish, contains just four species which are all endemic to Australia and are all temperate though the eastern hulafish, Trachinops taeniatus, is occasionally kept in tropical marine aquariums.

The remaining three species are found in the waters of Victoria, Tasmania, South Australia and southern Western Australia making them incompatible with the temperatures of tropical marine aquariums. These fish are however, ideally suited to small temperate aquariums. Like most longfins, hulafish take well to captivity, readily taking a wide variety of prepared foods and cope well with captive conditions.

These fish are generally small, with 2 species reaching 15cm and the other two reaching 8-10cm but with a body shape that more closely resembles a wormfish (*Microdesmidae*) or dartfish (*Ptereleotridae*). They fare well in small groups but only in large aquariums due to heirachical aggression.

Close

While the majority of longfins are either seldom seen in the aquarium trade or are not suitable for tropical marine aquariums, those that are encountered make for perfect aquarium inhabitants.

On the whole, these fish are exceptionally peaceful and do not require particularly large aquaria due to their behaviour which sees them lingering around rocky crevices, overhangs or caves. Despite their often large mouths (specifically in the larger species), these fish pose little to no threat to other fish though care should be taken when mixing these fish with ornamental crustaceans such as shrimp.

ABOUT THE AUTHOR

Aaron Sewell

In 2004 Aaron completed a BSc (Marine Science) at the University of Sydney with majors in marine biology and tropical marine science. Since 2001 he has been involved with the aquarium industry at hobbyist and retail level and now works in aquarium product development. Aaron is a former committee member of the Marine Aquarium Society of Sydney and has collected fish and corals in Fiji for the US and European aquarium industries. Aaron has been writing for several local and international aquarium magazines since 2004.

First Time at Sea
a reefkeeping journal

I'm 5 months into my Reefkeeping and so far, its been a fantastic experience that's easier than its reputation might suggest. I think my success is largely due to my avoidance of difficult corals and a moderate dose of patience (I only have four fish in the 350L tank at present). I'm still sometimes taken by the urge to add more brightly coloured fish that I see at the local aquariums - but to date I've largely resisted the urge. The fourth and fifth months of Reefkeeping in my case were characterised by a resurgence in green hair algae, presumably associated with a rise in nitrate in the aquarium water.

This makes logical sense as ammonia and nitrite have been reading zero for at least twelve weeks now - and the nitrogenous waste has to end up somewhere. Obviously, I'd like it to end up as nitrogen gas -- but the microbes that facilitate nitrification are pretty slow growing and take time to build up to a reasonable number. The result is that while the worst excess of instability are in the past, the tank still undergoes miniature "cycling events" when too much nitrogen becomes available. This came to a bit of head around a month ago (the four month mark) and many of the live rocks had soft filamentous green or brown algae growing upon their surfaces. Sadly, and perhaps a little unexpectedly, the Trochus snails in the tank didn't seem interested in this longer filamentous algae, and spent more time on the glass than anywhere else.

An algae eating machine. The Kole Tang is a most impressive fish in its own right. Whilst not blinding bright, it's subtle dot and stripe patterning, yellow eye-ring and orange fins are, when you take the time to look, very beautiful.

To attempt to remedy this, I consulted with my local fish store who suggested I should add a Kole Tang (*Ctenochaetus strigosus*) -- see the photo of my specimen right. Within 3 days - the algae was gone! Unfortunately the species doesn't seem interested in the

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small pieces of Caulerpa that persist on the rocks, but you can't have everything! There seems to be a bit of debate about how to pronounce the common name of the species - at least in the reading I've done - some people say "coal-ee" others say "coal" in Australia, those people I've heard say it use "Coal". There's also lot of discussion on the web about the species being the King's fish in Hawaii and it being illegal (a kapu) to eat. Scholarly articles, seem to have less to say - so I'd love to know whether there was more to this suggestion! Regardless, the species at least in my estimation is a great tang which is smaller growing and less prone to disease than some of its cousins!

July 2012 - with filamentous algae

late September 2012 - without filamentous algae. The removal of the filamentous algae has caused the coraline algae to thrive! NB: Xenia growth!

In terms of sheer impressive speed of growth I think my pulsating Xenia should win some kind of prize. Back in July it consisted just of two main stalks (see the photos on the next page). The second of these grew up onto - and attached itself to - another piece of live rock, before detaching itself from the main colony. The result is that scarcely 12 weeks after its purchase, this coral has at least doubled in size. I should also report that the the red mushrooms I discussed back in July, did something quite odd soon after being added to the tank. In the top picture below you can see they're open (in July) on a piece of live rock in the centre of the aquarium. Many of the polyps detached from this piece of rock and fell down to lower sections of the aquarium (where they are now doing well!) I wasn't sure whether they were in a position that was too bright, or perhaps they were just poorly attached. Regardless of the cause, I took the opportunity to also move the green

the tank as it looked back in July 2012...

and how the tank looks today in late September. The good folks at Cairns Marine provided some really beautiful leathers, palm-tree corals (top back), Green star polyps and really bright green zoanthids (front). I bought some Fluffies (*Rhodactis* spp., front-left), *Duncanopsammia* (left top) and Green Euphyllia in a moment of weakness. The work of the Kole Tang (nobly assisted by my mainly Trochus-based snail crew) is very obvious in the reduction in algae. Over the course of the ~12 weeks between these photos the Xenia has almost doubled in size - and is represented in the lower photo in two pieces (both in the centre) as it grew across two rocks and broke itself in half.

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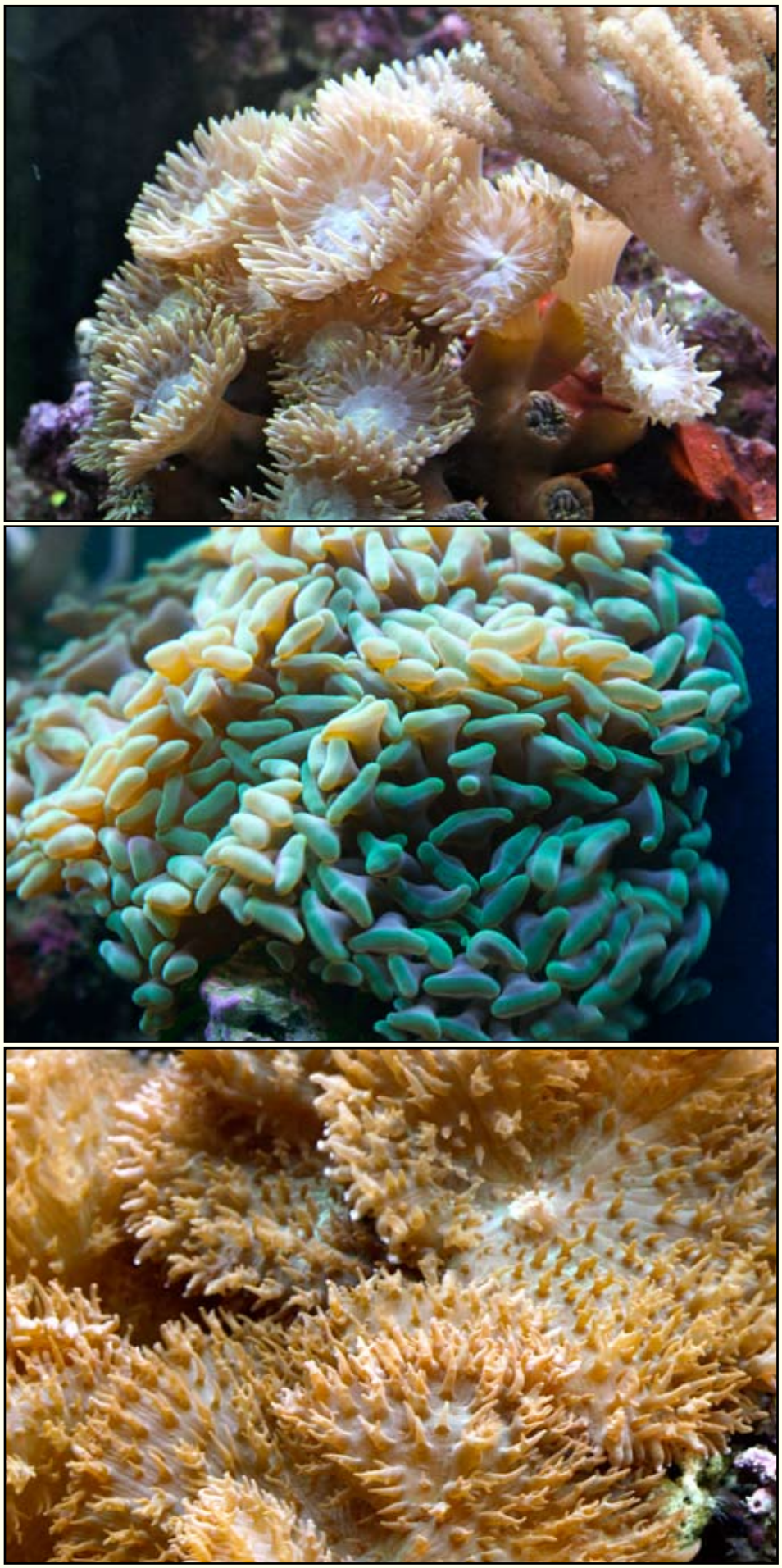
mushrooms lower in the aquarium. At this position with less light they seem to open wider and look "happier".

Post July, I encountered an increasing number of sea urchins on the live rock. I suspect, many were hiding in the rock and perhaps during cycling were less active (due to being negatively impacted by the nitrogenous waste cycled during this process). I don't have any evidence for this supposition, it's just based on the fact that I hadn't observed them previously -- they seem unlikely to be breeding! -- and there was quite a lot of urchins.

I realise one or two urchins won't be a problem in the tank - but I had quite a lot of urchins in the main tank and decided that perhaps there was just too many to safely keep in the display. I'd read that they can strip a lot of the coralline algae from rocks and even bother some corals. So, after a bit of deliberation I decided I would move most of these to the sump - to the point where now I think their population there numbers 20 or so. There's only two species represented:



Three detailed photos from the aquarium. *Duncanopsammia* (top), *Euphyllia* (centre) and Fluffies (bottom).

the first I think is the Decorator Urchin (*Tripneustes spp*) while the second is the Rock-Boring Urchin (*Echinometra spp*).

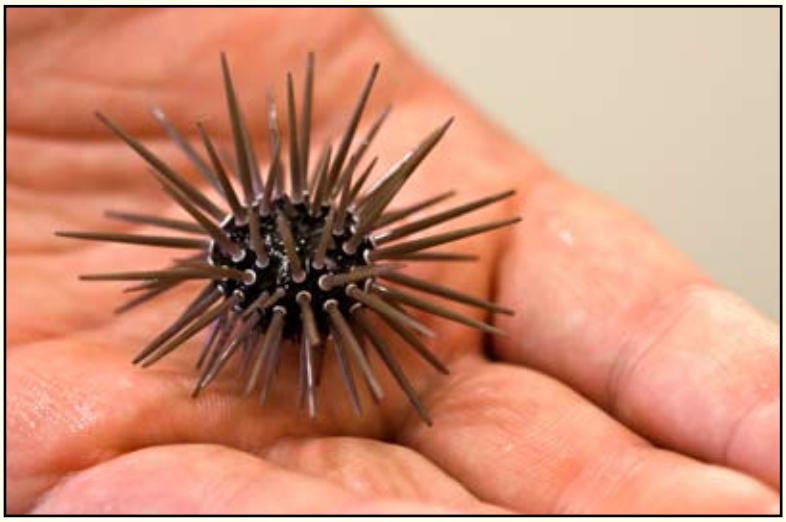
In the sump, they've stripped almost all the algae from the walls and the rocks. There's some native Caulerpa in there too, though like the Kole Tang, these urchins don't seem that interested in eatng it. I had hoped in the sump to create a bit of a refugia, so in time I'm going to have to get rid of my considerable cohort of urchins! If anyone has a burning interest in urchins let me know, I have 20 to spare!

Next month I'll be giving a bit of a run down on feeding, will cover the new additions to the tank - and the fate of my urchin colony!

ABOUT THE AUTHOR

David Midgley

When he's not editing Redfish Magazine, David Midgley is a scientist who has a PhD in Microbial Ecology and works with microbes in the subsurface. He lives in Sydney, Australia with his wife, kids, cats and now - Reef Aquarium.



Two types of urchins occurred on the live rock. The fuzzy-type, which I think are Decorator Urchins (*Tripneustes*) while the second are Rock Boring Urchins (*Echinometra*).

Some Sea Urchins are venomous - so take more care than I did - and don't use your hand!

photo by Khantipol

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ACE - Australian Cichlid Enthusiasts
http://www.aceforums.com.au

Australia New Guinea Fishes Association (ANGFA)
http://www.angfa.org.au

Koi Society of Australia

> Coffs Harbour
Meets 14:00, last Sun. each month. 7-9 Prince St. Bellingen.
> Newcastle
Meets 19:00, 1st Tue. each month. P: 4959 6000
> Central coast
Meets 11:00, 1st Sun. each month. Watanobbi Community Centre, Watanobbi.
> Northern Sydney
Meets 20:00, 2nd Wed. each month. West Pymble Memoric Hall, West Pymble.
> Cumberland
http://ksacumberland.webs.com
Meets 19:30, 3rd Wed. each month. Brennan Park Hall, Smithfield.
> Macarthur
Meets 19:30, 4th Mon. each month. Currans Hill Community Hall, Currans Hill.
> Illawarra
Meets 19:00, 4th Tue. each month. Flinders Community Hall, Flinders.
> Southern NSW
P: 02 4454 0194

Marine Aquarium Society of Sydney
http://www.masa.asn.au/mass/
e: mass@masa.asn.au

New South Wales Cichlid Society (NSWCS)

http://www.nswcs.org.au/
Meets 19:30, 1st Sat. each month, Nuwarra Public School, Moorebank.

New South Wales Cichlid Society (NSWCS) - Illawarra.
Meets 19:30, 2nd Sun. each month, Kanahooka High School, Kanahooka.

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http://drupal.cdas.org.au/
Meets 19:30, 3rd Tue. each month. Harmonie German Club, Narrabundah.

Canberra Killifish Study Group (CKSG)
http://drupal.cdas.org.au/content/killi-corner

Australian Koi Association
http://www.akakoi.com

South Australia

South Australian Aquarium Society Inc.
http://aquariums.2om.com/

South Australian Native Fish Association
www.sanfa.org.au
sanfa@bold.net.au

Western Australia

Marine Aquarium Society of WA
www.masa.asn.au/maswa/
maswa@masa.asn.au
phone:
Chris Sutton
0419 858 108

Perth Cichlid Society
www.perthcichlid.com.au

Koi Society of WA
www.koiclubwa.com
Meets 19:30, 4th Wed. each month. Rotary Hall, South Perth.

ADVANCED AQUARIST
http://www.advancedaquarist.com/

Victoria

Aquarium Society of Victoria
http://asofv.com.au/

Marine Aquarium Society of Victoria (MASOV)
http://ozreef.org/masov.html
e: dbw@ozreef.org

Eastern Districts Aquarium Society
http://www.edas.com.au/
Meets 4th Fri. each month, Willis Rm, Council Offices Nunawading.

EDAS plant study group
http://www.edaspsg.org/

Queensland

MARINE AQUARIUM SOCIETY OF REGIONAL QUEENSLAND
http://www.masrq.org
e: info@masrq.org

MARINE AQUARIUM SOCIETY OF QUEENSLAND
http://www.masa.asn.au/masq.php
e: info@masq.ws
P: 07 3261 8582

ANGFA Qld
http://www.angfaqld.org.au

Gold Coast Aquarium Society (GCAS)
http://www.gcas.net.au

Aquarium and Terrarium Society of Queensland
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Tasmania

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Hobart Cichlid Society
www.tassiecichlids.com

Wide Bay Aquarium Society
wbaqs.com.au/forum/index.php

New Zealand

Federation of New Zealand Aquatic Societies
http://www.fnzas.org.nz/

Internet

Oz fish for sale
http://www.ozfishforsale.com.au

SaltyTank
http://www.saltytank.com

Corkboard courtesy: Christian Guthier

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